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His Leu Arg Pro Lys Glu Asp Arg Pro Asp Ala Pro Ser His Ala Glu
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Thr Ile Gly Arg Lys Leu Xaa Ser Thr Asn Ser Ala Leu Lys Ala Ala
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    1235   1240   1245

Asn Thr Ser Ser Gly Tyr Pro Tyr His Lys Gln Lys Ser Lys Asp
    1250   1255   1260

Trp Thr Gly Ser Ala Phe Ile Gly Xaa Leu Gly Asp Gln Ala Thr
    1265   1270   1275

His Ala Asn Asn Met Tyr Glu Met Gly Lys Ser Met Arg Pro Ile
    1280   1285   1290

Tyr Thr Ala Ala Leu Lys Asp Glu Leu Val Lys Pro Asp Lys Ile
    1295   1300   1305

Tyr Gly Lys Ile Lys Lys Arg Leu Leu Trp Gly Ser Asp Leu Xaa
    1310   1315   1320

Thr Met Ile Arg Ala Ala Arg Ala Phe Gly Pro Phe Cys Asp Ala
    1325   1330   1335

Leu Lys Glu Xaa Cys Ile Phe Asn Pro Ile Arg Val Gly Met Ser
    1340   1345   1350

Met Asn Glu Asp Gly Pro Phe Ile Phe Ala Arg His Ala Asn Phe
    1355   1360   1365

Arg Tyr His Met Asp Ala Asp Tyr Thr Arg Trp Asp Ser Thr Gln
    1370   1375   1380

Gln Arg Ala Ile Leu Lys Arg Ala Gly Asp Ile Met Xaa Arg Leu
    1385   1390   1395

Ser Pro Glu Pro Asp Leu Ala Arg Val Val Met Asp Asp Leu Leu
    1400   1405   1410

Ala Pro Ser Leu Leu Asp Val Gly Asp Xaa Lys Ile Val Val Glu
    1415   1420   1425

Glu Gly Leu Pro Ser Gly Cys Pro Cys Thr Thr Gln Leu Asn Ser
    1430   1435   1440

Leu Ala His Trp Ile Leu Thr Leu Cys Ala Met Val Glu Val Thr
    1445   1450   1455

Arg Val Asp Pro Asp Ile Val Met Gln Glu Ser Glu Phe Ser Phe
    1460   1465   1470

Tyr Gly Asp Asp Glu Val Val Ser Thr Asn Leu Glu Leu Asp Met
    1475   1480   1485

Val Lys Tyr Thr Met Ala Leu Arg Arg Tyr Gly Leu Leu Pro Thr
    1490   1495   1500

Arg Ala Asp Lys Glu Glu Gly Pro Leu Glu Arg Arg Gln Thr Leu
    1505   1510   1515

```
Gln Gly   Ile Ser Phe Leu Arg   Arg Ala Ile Val Gly   Asp Gln Phe
    1520                  1525                  1530


Gly Trp   Tyr Gly Arg Leu Asp   Arg Ala Ser Ile Asp   Arg Gln Leu
    1535                  1540                  1545


Leu Trp   Thr Lys Gly Pro Asn   His Gln Asn Pro Phe   Glu Thr Leu
    1550                  1555                  1560


Pro Gly   His Ala Gln Arg Pro   Ser Gln Leu Met Ala   Leu Leu Gly
    1565                  1570                  1575


Glu Ala   Ala Met His Gly Glu   Lys Tyr Tyr Arg Thr   Val Ala Ser
    1580                  1585                  1590


Arg Val   Ser Lys Glu Ala Ala   Gln Ser Gly Ile Xaa   Met Val Val
    1595                  1600                  1605


Pro Thr   Pro Pro Ile Cys Phe   Ala Leu Gly Ala Leu   Trp Asn Asn
    1610                  1615                  1620


Gly Cys
    1625



<210> 3
<211> 541
<212> PRT
<213> Murine Norovirus type 1


<220>
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<222> (32)..(32)
<223> Variable amino acid

<220>
<221> misc_feature
<222> (52)..(52)
<223> Variable amino acid

<220>
<221> misc_feature
<222> (106)..(106)
<223> Variable amino acid

<220>
<221> misc_feature
<222> (291)..(291)
<223> Variable amino acid
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<400> 3

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Met Arg Met Ser Asp Gly Ala Ala Pro Lys Ala Asn Gly Ser Glu Ala
1               5                   10                  15


Ser Gly Gln Asp Leu Val Pro Ala Ala Val Glu Gln Ala Val Pro Xaa
            20                  25                  30


Gln Pro Val Ala Gly Ala Ala Leu Ala Ala Pro Ala Ala Gly Gln Ile
        35                  40                  45


Asn Gln Ile Xaa Pro Trp Ile Phe Gln Asn Phe Val Gln Cys Pro Leu
        50                  55                  60


Gly Glu Phe Ser Ile Ser Pro Arg Asn Thr Pro Gly Glu Ile Leu Phe
65                  70                  75                  80


Asp Leu Ala Leu Gly Pro Gly Leu Asn Pro Tyr Leu Ala His Leu Ser
                85                  90                  95


Ala Met Tyr Thr Gly Trp Val Gly Asn Xaa Glu Val Gln Leu Val Leu
            100                 105                 110


Ala Gly Asn Ala Phe Thr Ala Gly Lys Val Val Val Ala Leu Val Pro
        115                 120                 125


Pro Tyr Phe Pro Lys Gly Ser Leu Thr Thr Ala Gln Ile Thr Cys Phe
    130                 135                 140


Pro His Val Met Cys Asp Val Arg Thr Leu Glu Pro Ile Gln Leu Pro
145                 150                 155                 160


Leu Leu Asp Val Arg Arg Val Leu Trp His Ala Thr Gln Asp Gln Glu
                165                 170                 175


Glu Ser Met Arg Leu Val Cys Met Leu Tyr Thr Pro Leu Arg Thr Asn
            180                 185                 190


Ser Pro Gly Asp Glu Ser Phe Val Val Ser Gly Arg Leu Leu Ser Lys
        195                 200                 205


Pro Ala Ala Asp Phe Asn Phe Val Tyr Leu Thr Pro Pro Ile Glu Arg
    210                 215                 220
```

```
Thr Ile Tyr Arg Met Val Asp Leu Pro Val Ile Gln Pro Arg Leu Cys
225             230         235             240

Thr His Ala Arg Trp Pro Ala Pro Val Tyr Gly Leu Leu Val Asp Pro
            245         250             255

Ser Leu Pro Ser Asn Pro Gln Trp Gln Asn Gly Arg Val His Val Asp
            260             265             270

Gly Thr Leu Leu Gly Thr Thr Pro Ile Ser Gly Ser Trp Val Ser Cys
        275             280             285

Phe Ala Xaa Glu Ala Ala Tyr Lys Phe Gln Ser Gly Thr Gly Glu Val
    290             295             300

Ala Thr Phe Thr Leu Ile Glu Gln Asp Gly Ser Ala Tyr Val Pro Gly
305             310             315             320

Asp Arg Ala Ala Pro Leu Gly Leu Pro Arg Phe Leu Trp Ala Thr Gly
            325             330             335

Asp Arg Gly Pro Asp Arg Asp His Gln Asp Trp Arg Gln Ala Gln Gly
            340             345             350

His His Phe Glu Met Ile Leu Gly Pro Thr Thr Asn Ala Asp Gln Ala
        355             360             365

Pro Tyr Gln Gly Arg Val Phe Ala Ser Val Thr Ala Ala Ala Ser Leu
    370             375             380

Asp Leu Val Asp Gly Arg Val Arg Ala Val Pro Arg Ser Ile Tyr Gly
385             390             395             400

Phe Gln Asp Thr Ile Pro Glu Tyr Asn Asp Gly Leu Leu Val Pro Leu
            405             410             415

Ala Pro Pro Ile Gly Pro Phe Leu Pro Gly Glu Val Leu Leu Arg Phe
            420             425             430

Arg Thr Tyr Met Arg Gln Ile Asp Thr Ala Asp Ala Ala Ala Glu Ala
        435             440             445
```

```
Ile Asp Cys Ala Leu Pro Gln Glu Phe Val Ser Trp Phe Ala Ser Asn
    450             455             460

Ala Phe Thr Val Gln Ser Glu Ala Leu Leu Leu Arg Tyr Arg Asn Thr
465             470             475             480

Leu Thr Gly Gln Leu Leu Phe Glu Cys Lys Leu Tyr Asn Glu Gly Tyr
            485             490             495

Ile Ala Leu Ser Tyr Ser Gly Ser Gly Pro Leu Thr Phe Pro Thr Asp
            500             505             510

Gly Ile Phe Glu Val Val Ser Trp Val Pro Arg Leu Tyr Gln Leu Ala
        515             520             525

Ser Val Gly Ser Leu Ala Thr Gly Arg Met Leu Lys Gln
    530             535             540
```

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<210> 4
<211> 208
<212> PRT
<213> Murine Norovirus type 1

<400> 4
Met Ala Gly Ala Leu Phe Gly Ala Ile Gly Gly Gly Leu Met Gly Ile
1           5               10              15

Ile Gly Asn Ser Ile Ser Asn Val Gln Asn Leu Gln Ala Asn Lys Gln
            20              25              30

Leu Ala Ala Gln Gln Phe Gly Tyr Asn Ser Ser Leu Leu Ala Thr Gln
            35              40              45

Ile Gln Ala Gln Lys Asp Leu Thr Leu Met Gly Gln Gln Phe Asn Gln
    50              55              60

Gln Leu Gln Thr Asn Ser Phe Lys His Asp Leu Glu Met Leu Gly Ala
65              70              75              80

Gln Val Gln Ala Gln Ala Gln Ala Gln Glu Asn Ala Ile Asn Ile Lys
            85              90              95

Thr Ala Gln Leu Gln Ala Ala Gly Phe Ser Lys Thr Asp Ala Thr Arg
            100             105             110
```

```
Leu Ala Leu Gly Gln Gln Pro Thr Arg Ala Val Asp Trp Ser Gly Thr
        115                 120                 125


Arg Tyr Tyr Thr Ala Asn Gln Pro Val Thr Gly Phe Ser Gly Gly Phe
    130                 135                 140


Thr Pro Thr Tyr Thr Pro Gly Arg Gln Val Thr Ser Arg Pro Val Asp
145                 150                 155                 160


Thr Ser Pro Leu Pro Ile Ser Gly Gly Arg Leu Pro Ser Leu Arg Gly
                165                 170                 175


Gly Ser Trp Ser Pro Arg Asp His Thr Pro Ala Thr Gln Gly Thr Tyr
            180                 185                 190


Thr Asn Gly Arg Phe Val Ser Leu Pro Lys Ile Gly Ser Ser Arg Ala
        195                 200                 205
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<210> 5
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 5
tccaggatga catagtccag gggcg                                         25


<210> 6
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 6
tgggatgatt tcggcatgga caacg                                         25


<210> 7
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer
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<400> 7
gtggtgctcg agtgcggccg caagctttat tattgtttga gcattcggcc tg          52


<210> 8
<211> 56
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 8
atccgaattc tagatgcacc accaccacca ccacatgagg atgagtgatg gcgcag      56


<210> 9
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 9
cggaattcgg atgaggatga gtgatggcgc a                                 31


<210> 10
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 10
tctcgacaag cttttattgt ttgagcattc ggcct                             35


<210> 11
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 11
ccaaaagcca atggctctga                                              20


<210> 12
<211> 20
<212> DNA
<213> Artificial Sequence
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<220>
<223> Primer

<400> 12
agttgaatgg gctccagggt                                              20


<210> 13
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 13
ccgccgggca aattaaccaa                                              20


<210> 14
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 14
aggtgggcaa ggtaggggtt a                                            21


<210> 15
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 15
gcgcagcgcc aaaagccaat                                              20


<210> 16
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 16
gagtcctttg gcatgctacc cagg                                         24


<210> 17
<211> 20
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<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 17
gccgccgggc aaattaacca   20

<210> 18
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 18
ggcttaaccc ctaccttgcc ca   22

<210> 19
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 19
cagtgccagc cctcttat   18

<210> 20
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 20
gtcccttgat gaggagga   18

<210> 21
<211> 41
<212> DNA
<213> Murine Norovirus type 1

<400> 21
ggaaagatgt ttgactctca ggtcattatc atcaccacaa a   41

<210> 22
<211> 42

<212> DNA
<213> Murine Norovirus type 1

<400> 22
ggaaagatgt ttgactctca ggtcattatc atcaccacaa at   42

<210> 23
<211> 54
<212> DNA
<213> Murine Norovirus type 1

<400> 23
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac cccc   54

<210> 24
<211> 65
<212> DNA
<213> Murine Norovirus type 1

<220>
<221> misc_feature
<222> (30)..(30)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (33)..(33)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (43)..(43)
<223> n is a, c, g, or t

<400> 24
ggaaagatgt ttgactctca ggtcattatn atnaccacaa atnaacaaac ccccgcgccc   60

ctgga   65

<210> 25
<211> 64
<212> DNA
<213> Murine Norovirus type 1

<220>
<221> misc_feature
<222> (43)..(43)
<223> n is a, c, g, or t

<400> 25
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atnaacaaac ccccgcgccc   60

ctgg   64

<210> 26
<211> 70
<212> DNA
<213> Murine Norovirus type 1

<400> 26
ggaaagatgt tgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc   60

ctggactatg   70

<210> 27
<211> 73
<212> DNA
<213> Murine Norovirus type 1

<220>
<221> misc_feature
<222> (43)..(43)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (64)..(65)
<223> n is a, c, g, or t

<400> 27
ggaaagatgc ttgactctca ggtcattatc atcaccacaa atnaacaaac ccccgcgccc   60

ctgnnctatg tca   73

<210> 28
<211> 77
<212> DNA
<213> Murine Norovirus type 1

<400> 28
ggaaagatgt tgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc   60

ctggactatg tcaacct   77

<210> 29
<211> 77
<212> DNA
<213> Murine Norovirus type 1

<400> 29
ggaaagatgt tgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc   60

ctggactatg tcaacct   77

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<210> 30
<211> 79
<212> DNA
<213> Murine Norovirus type 1

<400> 30
ggaaagatgc ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaacctgg                                                   79


<210> 31
<211> 79
<212> DNA
<213> Murine Norovirus type 1

<400> 31
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaacctgg                                                   79


<210> 32
<211> 79
<212> DNA
<213> Murine Norovirus type 1

<400> 32
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaacctgg                                                   79


<210> 33
<211> 79
<212> DNA
<213> Murine Norovirus type 1

<400> 33
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaacctgg                                                   79


<210> 34
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 34
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag     120

agccctg                                                               127
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<210> 35
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 35
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag      120

agccctg                                                               127


<210> 36
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 36
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag      120

agccctg                                                               127


<210> 37
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 37
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag      120

agccctg                                                               127


<210> 38
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 38
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag      120

agccctg                                                               127


<210> 39
<211> 127
<212> DNA
<213> Murine Norovirus type 1
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<400> 39
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc   60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgatgag   120

agccctg   127

<210> 40
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 40
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc   60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag   120

agccctg   127

<210> 41
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 41
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc   60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag   120

agccctg   127

<210> 42
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 42
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc   60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag   120

agccctg   127

<210> 43
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 43
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc   60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag   120

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agccctg                                                              127


<210> 44
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<220>
<221> misc_feature
<222> (24)..(24)
<223> n is a, c, g, or t

<400> 44
ggaaagatgt ttgactctca ggtnattatc atcaccacaa atcaacaaac ccccgtgccc     60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgctgag    120

agccctg                                                              127


<210> 45
<211> 127
<212> DNA
<213> Murine Norovirus type 1

<400> 45
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgtgccc     60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgatgag    120

agccctg                                                              127


<210> 46
<211> 117
<212> DNA
<213> Murine Norovirus type 1


<220>
<221> misc_feature
<222> (73)..(73)
<223> n is a, c, g, or t

<400> 46
ggaaagatgc ttgactctca ggtcattatc ataccacaaa tcaacaaacc cccgcgccct     60

ggactatgtc aanctggagg cggtctgccg ccgcatagat ttcctggttt atgctga      117


<210> 47
<211> 124
<212> DNA
<213> Murine Norovirus type 1
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<220>
<221> misc_feature
<222> (75)..(75)
<223> n is a, c, g, or t

<400> 47
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaanctgga ggcggtctgc cgccgcatag atttcgttta tgatgagagc     120

cctg                                                                 124


<210> 48
<211> 119
<212> DNA
<213> Murine Norovirus type 1


<220>
<221> misc_feature
<222> (75)..(75)
<223> n is a, c, g, or t

<400> 48
ggaaagatgt ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgcgccc      60

ctggactatg tcaanctgga ggcggtctgc cgccgcatag atttcctggt ttatgctga     119


<210> 49
<211> 127
<212> DNA
<213> Artificial Sequence

<220>
<223> Consensus sequence

<400> 49
ggaaagatgy ttgactctca ggtcattatc atcaccacaa atcaacaaac ccccgygccc      60

ctggactatg tcaacctgga ggcggtctgc cgccgcatag atttcctggt ttatgmtgag     120

agccctg                                                              127


<210> 50
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Illustrative MNV-1 ORF1 motif


<220>
<221> misc_feature
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<222> (2)..(3)
<223> Variable amino acid

<220>
<221> misc_feature
<222> (5)..(5)
<223> Variable amino acid

<400> 50
Gly Xaa Xaa Gly Xaa Gly Lys Thr
1               5


<210> 51
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Illustrative MNV-1 ORF1 motif

<400> 51
Gly Asp Cys Gly
1


<210> 52
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Illustrative MNV-1 ORF1 motif

<400> 52
Lys Asp Glu Leu
1


<210> 53
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Illustrative MNV-1 ORF1 motif

<400> 53
Gly Leu Pro Ser
1


<210> 54
<211> 4
<212> PRT
<213> Artificial Sequence
```

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<220>
<223> Illustrative MNV-1 ORF1 motif

<400> 54
Tyr Gly Asp Asp
1
```